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PROBLEMS OF PROLIFERATION

During the pre-dawn of the nuclear age a tight security lid was clamped over the U.S. Army Engineers' Manhattan Project. The enemy was not to be forewarned. Of equal importance, neither was any success in the effort to be shared with friends. The atom's staggering power was to become a permanent United States monopoly maintained by harboring from all others both the know-how and fissionable ingredients needed to fabricate atomic weapons. Following the war the Atomic Energy Act of 1946 cut off even our British partners in the original effort from further U.S. weapons data. The Act took the extreme precautionary step, since retraced, of nationalizing all material capable of nuclear fission. Until this day the constant public policy of the United States has been against proliferation of nuclear weapons to other countries.

Despite this stern policy and our many vigorous protests, the world's "Nuclear Club" now has a membership of five. Unquestionably assisted by effective espionage, the U.S.S.R. gained membership in 1949. This prompted the British to produce their bomb by 1952. Following a rule-of-thumb that any relatively industrialized country with a $2-3 billion desire for nuclear weapons can have them, France became the fourth nuclear power in 1960 and Red China the fifth in 1964.

Russian and English stockpiles of enriched uranium, plutonium and hydrogen weapons are regarded by many experts to rival the American stockpile in ingenuity. Available evidence on the French indicates reliance on plutonium techniques, but they have announced an enrichment program. They are expected to test their thermonuclear research this year by exploding a hydrogen device at a South Pacific test site. Contrary to expectations China exploded an enriched uranium device rather than a plutonium bomb. Its significance is that enrichment evidences greater technological sophistication than plutonium production.

The British, who gained American nuclear knowledge honestly, and the Russians, who got it otherwise, evidence the impossibility of suppressing technology for long by secrecy measures and security regulations. On their part, the French and Chinese demonstrate that neither a democracy nor a dictatorship will be deterred from the nuclear weapons path by pleas to allocate the massive effort involved to more productive channels. There are possibly a dozen more countries now scientifically, industrially and financially capable of building primative nuclear devices. These include: Canada, Sweden, Spain, Israel, the U.A.R., Italy, Czechoslovakia, West

Germany, East Germany, Argentina, India and Japan. It is certain the American anti-proliferation policy will not dissuade them if real or imagined national interests spark the will to undertake the necessary sacrifices. However, this is not to say that other negative influences might prevail, such as discouragement from a powerfully disapproving neighbor, concerted economic retaliation and the like.

As the world has turned increasingly to nuclear power for electric generation, opportunity for proliferation has enlarged. Power reactors unavoidably produce some amounts of plutonium as a by-product. As a control measure, the U.S. once seriously considered buying up the Free World's by-product plutonium. The idea proved financially impractical. Instead, increasing reliance has been placed on the International Atomic Energy Agency to police plutonium away from military channels. However, no such resort to the IAEA has been made in the case of enriched uranium, the alternate fissionable material suitable for A-bomb manufacture. In this case the U.S. has stepped up efforts to suppress knowledge of the inner workings of American enrichment facilities. Tight domestic accounting for the material has been established and exports limited to slightly enriched uranium, suitable for power reactors but not bomb fabrication. Successful pressures have been maintained on Britain, the only other Free World enriched uranium producer, to do likewise.

Expressing frequent concern over the proliferation problem, President Johnson recently appointed a Task Force to study (1) its relationship to U.S. military and civilian programs; and, (2) the more general question of how independent nuclear programs of other nations "may be confined to peaceful purposes." The Task Force report is due early this year. Headed by former Defense Undersecretary Roswell Gilpatric, now slated to head CIA, the group consists of: Arthur H. Dean, former test ban treaty negotiator; Allen W. Dulles, ex-CIA Director; Gen. Alfred M. Gruenther, an Eisenhower advisor; Dr. George B. Kistiakowsky, ex-White House Science Advisor; John J. McCloy, Chairman of the Disarmament Agency's General Advisory Committee; Dr. James A. Perkins, a member of that Committee; Arthur K. Watson, IBM official; William S. Webster, utility executive; and Dr. Herbert F. York, former DoD research chief.

Despite past failures of the anti-proliferation policy, the group's charter apparently fails to include a review of its basic wisdom, future practicality or possible alternatives. The official connections and past statements of several members lead some observers to believe the Task Force will have difficulty emerging from present rutted levels of official disarmament thinking and coming up with fresh ideas. It will be of particular interest to learn how the glaring inconsistency between our approaches to the plutonium and enriched uranium policing problems is dealt with -- or if it is dealt with at all.

If the Task Force is to perform any signal service it must take the wraps off a threat toward proliferation so far substantially withheld from public discussion. This threat is a rapidly developing technology for easier and cheaper uranium enrichment -- the centrifuge process. It was hopefully considered by Manhattan Project engineers but then existing limitations on high stress materials voided manufacture of the advanced centrifuges required. Within the technology of the war years, however, was the gaseous diffusion approach and the giant, multi-billion dollar diffusion plants at Oakridge and elsewhere resulted. These facilities separate uranium's fissionable U235 isotopes, constituting 1/10th of one-percent of natural uranium,

from its remaining non-fissionable U238 atoms. The two isotopes are chemically indistinguishable from each other so cannot be sorted apart by the chemical means dissimilar elements are segregated. The sorting process has to be based on the infinitesimally small three neutron weight difference between them. Success of the diffusion process stems from the fact that in gaseous solution U235 will pass through a sieve of atomically small holes slightly easier than U238. Sieving the solution enough times eventually obtains uranium "enriched" in the fissionable U235 isotope. In contrast, a centrifuge accomplishes this segregation by the same simple principle cream is separated from milk.

Long strides have been taken in metallurgy in the decades since World War II. Tough new materials are available which put practical uranium centrifuges just on the horizon if, in fact, they are not already here. These devices will require neither the great capital investment nor the large physical plants associated with gaseous diffusion. Both technologically and financially uranium enrichment will pass within the grasp of a growing number of countries. It will be propelled only partially by military considerations. The centrifuge has great economic appeal in such civilian fields as separation of viruses for preparation of vaccines, chemical production and other industrial processes. The cost of civilian power could be brought down by cheaper enriched uranium. Abroad there are many countries with uranium ore to which a share in the market for enriched uranium power reactor cores would prove a bonanza. At home, we must give increasing thought to the replacement of our aging diffusion plants. Inescapably the centrifuge will play a role in all these endeavors and more. Already the West Germans have spent some $1 3/4 million on advanced research and the East Germans have filed centrifuge patents.

The U.S. response to these developments has been dubbed a quixotic effort to "uninvent" the wheel, which, in simplest terms, is the heart of the centrifuge. Access to such work as the AEC has carried on is denied to industry. The British, West Germans, Dutch and others have been induced to classify their research. These moves aim not at stopping centrifuge progress, but at slowing it down and delaying the day when its consequences in terms of nuclear proliferation must be dealt with. The time gained will be valueless, however, unless used quickly to learn what to do. It may prove negative in value should the attempt to sweep applications of modern science under the rug bar the IAEA from learning procedures for policing uranium enrichment as a parallel to its plutonium surveillance functions.

Moreover, a second proliferation problem dwarfing even that posed by the centrifuge may be sweeping down upon us. It is the probability of someone inventing an all fusion weapon -- a pure hydrogen bomb. Today's H-bombs require the great heat and energy from a plutonium or enriched uranium "trigger" bomb to start the thermonuclear process of hydrogen fusion. H-bombs produce yields in the megatons while A-bombs are confined mostly to kiloton ranges. If a non-atomic means to initiate hydrogen fusion can be found the entire plutonium/enriched uranium requirement can be skipped. The world's vast supply of hydrogen will become available for unlimited manufacture of a truly "poor man's" H-bomb. Recent demonstration of the capability of lasers to focus great energy on a given point at a precise time is a case in point. In their present stage of development these devices are powerless to trigger hydrogen fusion. But future developments powerful enough for the purpose utilizing lasers or some other exotic technique for energy storage and release cannot be ruled out.

Thus, from a technological standpoint the genie is out of the bottle -- or so close to it that efforts to ram it back in seem increasingly futile. Possibly the President's Task Force could perform its best service by declaring this fact and calling for intelligent examination of the proliferation problem as it actually is, rather than as so many close their minds and hopefully wish it to be.

Even now, except from Washington quarters, some new suggestions are being voiced for handling it. Some of them are quite unusual. From the right and left editor William F. Buckley, Jr., of National Review and entertainer Steve Allen, a frequent Committee for a Sane Nuclear Policy spokesman, have joined in one. The pair want to tear up Red China's Nuclear Club membership card by dropping U.S. A-bombs on its nuclear installations. The same treatment would be promised any future Club applicant. A Texas political science professor makes the same suggestion, except that conventional bombs are recommended. Unfathomly he explains that President Johnson could get away with the caper since he is well known throughout the world as a man of peace. In contrast, asserts the professor, Goldwater as President couldn't have pulled it off under the handicap of his "trigger-happy" image.

Still another suggestion for coping with a potential "bad-country" is to employ the same deterrent principle that keeps the U.S. and the U.S.S.R. from clobbering each other. This concept calls for the two senior nuclear powers to join in a threat of massive retaliation against any third power firing off a nuclear weapon in anger. Still others think it would be better for the two old-timers to learn how to make tiny, clean nuclear devices. These then would be furnished cut-rate to tiny, troublesome countries on the theory their use would be less disturbing to world peace than the messy conventional armaments they will otherwise be using.

Fortunately the foregoing is unlikely to exhaust the list of possible fresh approaches to the proliferation problem. Unfortunately, however, the quickie review being made by the Presidential Task Force also is unlikely to turn up for proper public evaluation many more of them.

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